e2v

argus™ 4

User's Manual
Manuel d'Utilisation
Benutzerhandbuch
Manuale Utente
Manual del Usuario
Användarhandbok

THERMAL IMAGING CAMERA SYSTEM

SAFETY NOTES

Before using this product, the customer shall read and understand all the instructions and warnings. e2v technologies does not accept responsibility for damage or injury resulting from failure to follow the instructions provided.

WARNINGS:

- The Argus™4 Thermal Imaging Camera System is despatched from e2v technologies in a safe condition. Any unauthorised modifications may compromise safety and invalidate the warranty.
- The Argus™4 is an aid to fire and rescue operations in smoke and darkness. It is not intended as a replacement for standard fire-fighting techniques. Users must ensure that all established procedures are followed.
- The Argus™4 is not certified as intrinsically safe and therefore must not be operated in potentially flammable or explosive atmospheres.
- All users must be trained in the correct operation, functionality and features of the Argus™4 before use.
- The Argus™4 can only be serviced by authorised personnel. There are no end-user serviceable parts except those described in the maintenance section of this manual.
- **Neglecting the above may result in injury or death.**

CAUTIONS:

- Never point the camera at a source of extreme temperature, e.g. the sun, as this can damage the detector.
- e2v technologies recommends that the Argus™4 is stored in the supplied case or storage mount.
- Failure to respond to the warning symbols that appear on the display may result in damage to the camera and the electronics.
- All matters arising, which relate to the safety of this product, should be reported immediately in writing, giving full details, to the Product Safety Officer at e2v technologies.

ENVIRONMENTAL:

- e2v technologies declares that the Argus™4 Thermal Imaging Camera System complies with EC directive 2002/95/EC (the RoHS Directive) restricting the use of certain hazardous materials in electrical and electronic equipment.
- The Argus™4 Thermal Imaging Camera System is classified as Electronic and Electrical Equipment according to directive 2002/96/EC (the WEEE Directive) and should be segregated from domestic waste for disposal. Alternatively, it may be returned to e2v technologies for safe disposal.
- This product does not contain toxic or hazardous substances or elements over the maximum permitted concentration values. Refer to the Argus™4 Thermal Image Camera customer information CD for more information.

  本产品不含有毒、有害物质或其浓度在允许范围内。详细信息请查阅随附的用户信息光盘

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INTRODUCTION

The Argus™4 is the latest generation of the Argus™ Thermal Imaging Camera (TIC) from e2v technologies. With over 25 years experience in fire-fighters' thermal imaging, e2v technologies continues to produce high quality, affordable systems designed for fire and heat detection for use with civilian, industrial and military rescue services.

The Argus™4 has been designed with digital imaging technology for a sharper picture and uses the highly successful Amorphous Silicon (ASi) Microbolometer Detector that is in use by many of the world's fire brigades.

The Argus™4 is simple to operate. It is a robust, self-contained camera, which has fully automatic operation; no control or adjustment is required in use. The Argus®4 is a small, lightweight, ergonomic camera and through proper use, the user will be able to:

- See through dense smoke and in darkness.
- Detect and display the relative temperatures of objects within the scene.
- Locate the seat and spread of the fire.
- Move swiftly in search and rescue of casualties.
- Have the ability to see in zero visibility conditions.
- Significantly improve safety and mobility.
- Monitor temperatures for preventive maintenance and condition monitoring of equipment.

The Argus™4 is designed to withstand the high temperatures, knocks and driving spray often encountered in the fire-fighting environment and has many features that can be customised by the end user. These features include:

- Capture of 100 images.
- Direct Temperature Measurement.
- Choice of colour palettes.
- Ambient Temperature Measurement.
- Customisable Start-up Screen.
- 2x Zoom (Argus™4 HR320: 2x and 4x Zoom).
- Time and Date.
- Removable Handle.

This manual contains information covering operation of the system and operating techniques, user maintenance, care of the product and a full technical specification.

Note: The P7030 and P7130 Series of thermal imaging cameras are subject to export controls. An export licence will be required if exported outside the EU.

1. OPERATION AND USE

1.1 System Configuration

1.	Rear Bumper	5.	Battery Release Button
2.	Battery	6.	Side Strap
3.	USB Data Lead Socket	7.	Ambient Temperature Sensor
4.	Front Bumper	8.	Removable Handle

1.	Date	7	Time
2.	Spot Temperature Target	8.	Training Bar
3.	Power LED	9.	Battery Bar
4.	Ambient Temperature Value	10.	Spot Temperature Value
5.	Image Capture Button	11.	Zoom Button
6.	ON/OFF Button		

1.2 Getting Started

- In the case with this manual are the following:

    - Camera with handle and side straps.
    - Two rechargeable battery packs.
    - Battery charger with mains leads.
    - Battery charging shoe.
    - Neck strap.
    - Remote control.
    - Customer software.
    - USB Data lead.

- The rechargeable batteries should be fully charged before use (see section 3). Fit the battery into the compartment on the top of the camera and push down until a click is heard. To remove the battery, press the battery release button and the battery will eject and can be removed.

- Turn on the camera using the middle red button on the rear. A RED light will be illuminated to show the camera is powered. A long (3 second) press is required to switch the camera off.

- After switch-on and for approximately 5 seconds, a start-up screen will be displayed on the camera screen while the system performs a self-test routine. This start-up screen is end-user configurable.

- The thermal image, with battery status display, training bar, time and date and ambient and spot temperature and spot target markings, will appear.

- While the Argus^{TM}4 is in operation, the camera has to recalibrate to maintain its performance and image quality. This is achieved by an internal shutter that “freezes” the image; this in turn allows the electronics to recalibrate and redisplay the image. This recalibration will only occur when necessary due to a change in scene or internal temperatures. The freezing of the image will last for less than 0.2 seconds.

- The Argus^{TM}4 camera can be used with or without the handle. To remove the handle, spin the large thumbwheel anti-clockwise until the handle detaches from the camera body. Refitting is the reverse of this, making sure that the locating pip is positioned correctly.

1.3 Camera Features

- **Dynamic Scene Colourisation (DSC)**
  The Argus^{TM}4 provides the end-user with a selection of colour palettes, which colourises the thermal image to allow the user to pinpoint the hottest areas within the fire scene.

  These colour palettes are:

  - Grey Scale (White Hot)
    Basic white-hot greyscale, expanded to cover the dynamic range of the scene with no colourisation.

  - Grey Scale (Black Hot)
    Basic black-hot grey scale, expanded to cover the dynamic range of the scene with no colourisation.

  - Heat-Finder Red (White Hot)
    Basic white-hot grey scale, expanded to cover the dynamic range of the scene with red colourisation of the hottest part of the scene.

  - Heat-Finder Red (Black Hot)
    Basic black-hot grey scale, expanded to cover the dynamic range of the scene with red colourisation of the hottest part of the scene.

  - Heat-Finder Soft Red (White Hot)
    Basic white-hot grey scale, expanded to cover the dynamic range of the scene with yellow to red colourisation of the hottest part of the scene.

  - Heat-Finder Soft Red (Black Hot)
    Basic black-hot grey scale, expanded to cover the dynamic range of the scene with yellow to red colourisation of the hottest part of the scene.

  - Heat Marker Red
    Basic white-hot grey scale, expanded to cover the dynamic range of the scene with a gradient of red colourisation above 150 °C.

  - Heat Marker Soft Red
    Basic white-hot grey scale, expanded to cover the dynamic range of the scene with a gradient of yellow through to red colourisation above 150 °C.

  - Half Colour
    A limited colour scheme that expands to cover the dynamic range of the scene.

  - Full Colour 1
    A full colour scheme that expands to cover the dynamic range of the scene.

- Full Colour 2
  An alternative full colour scheme that expands to cover the dynamic range of the scene.

- Full Colour 3
  An alternative full colour scheme that expands to cover the dynamic range of the scene.

- Green Scale
  Basic green scale colour scheme that expands to cover the dynamic range of the scene.

- **Direct Temperature Measurement**

The Argus™4 allows the operator to view the average temperature of the centre spot of the scene (defined by the target markings). The temperature reading is displayed in the bottom right-hand corner of the display. This system is intended to give the operator the ability to detect possible hazards such as hot gas bottles or tanks.

The camera can be configured to give a reading in degrees Celsius or degrees Fahrenheit by using the user software or the remote control. Scene temperatures between -40 and +800 °C (-40 and +1472 °F) can be displayed. (Argus™4 HR320: -40 and +1000 °C; -40 and +1832 °F). This feature can be turned off if not required by using the software provided.

Note: If the object in the scene does not fully fill the target marks then a false reading may be obtained.
Different materials have differing surface emissivities, which will produce variations in the temperature readings. Variations can also be caused by the distance from the object. This temperature measurement must be regarded as an indication and not a guaranteed reading.
If the temperature falls outside the maximum value, the display will show “+++“.

- **SceneSave™ Image Capture**

Up to 100 images can be captured and stored in the Argus™4. These images can then be viewed or deleted using the remote control or software provided. See section 2 for details of remote control. Using the software provided, captured images can be downloaded to a suitable laptop/PC in several formats.

To capture an image, press the left-hand button. The image capture symbol appears for a short time above the ambient temperature reading and the number of the image out of 100 will also be indicated on the display.

If the image capture button is pressed and the camera already has 100 images stored, a ‘CAMERA FULL’ warning will appear. Before further images can be captured, unwanted images will need to be deleted using the remote control or software.

- **Tri-Mode Sensitivity**
  The Argus™4 has three levels of sensitivity: High, Low and Extended Low. These levels provide the user with a thermal image over the widest possible temperature range. The Argus™4 will switch to the optimum level of sensitivity automatically and will indicate which mode the camera is using by a coloured "M" symbol at the top of the display.

  - High Sensitivity Mode **M**
    The Argus™4 will operate in High Sensitivity mode under normal operating conditions and is indicated by a green "M" symbol. The image that is produced is clearer and will show more detail. The temperature range for this mode is between –40 °C and 150 °C (-40 °F and 302 °F).

  - Low Sensitivity Mode **M**
    The Argus™4 will automatically switch to Low Sensitivity mode when higher temperatures have been detected. It is indicated by an orange "M" symbol. The image that is produced loses some clarity, but will still show a significant amount of detail. The temperature range for this mode is up to 400 °C (750 °F).

  - Extended Low Sensitivity Mode **M**
    If the scene has extreme temperatures, the Argus™4 will automatically switch to Extended Low Sensitivity mode, indicated by a red "M" symbol, and allows an image to be produced that is clear and will show some detail. The temperature range for this mode is up to around 800 °C (1472 °F). (Argus™4 HR320: 1000 °C; 1832 °F).

- **Zoom**

  A short press on the right-hand button operates the zoom function. The zoom symbol will appear to the right of the display above the spot temperature reading and is indicated by the magnifying glass icon on the screen.

  The temperature measurement sample window is also expanded to suit. The zoom feature can be turned off if not required by using the software provided.

- **Ambient Temperature**

  The ambient temperature sensor is fitted to the front of the camera and the ambient temperature is displayed on the bottom left-hand side of the display.

  The range for ambient temperature measurement is -15 °C (5 °F) to 150 °C (302 °F). If ambient temperature measurement is not required, it can be turned off using the software and the reading will be removed from the display. The ambient temperature will be shown with any image captured.

Note: The ambient temperature is an indication only.
If the temperature falls outside the minimum value, the display will show "---".
If the temperature falls outside the maximum value, the display will show "+++".

- **Time and Date**
  Time and date are displayed at the top of the screen in the format:

  dd/mm/yy hh:mm:ss

  The date and time can be adjusted using the remote control or software provided and will be shown on any image captured. US date format can be selected via the customer software if required. This feature can be turned off if not required by using the customer software.

1.4 Display Warning Graphics

The Argus^{TM}4 is equipped with an advanced microprocessor based control and user warning system. In addition to controlling the automatic operation of the camera to ensure the best possible picture at all times, the control system provides graphics on the display to alert the user to certain conditions as follows:

- **Over-temperature Warning**

  As the circuitry within the camera approaches its maximum internal operating temperature, a warning symbol in the shape of a thermometer will appear to the left of the battery display. The camera will continue to operate at this temperature, but the user may see some degradation of the image quality.

  If the user ignores this warning and continues to operate the camera in very high temperatures, the warning symbol will flash.

  When the flashing temperature warning is present, the camera is very close to its absolute operating limit and the image will start to degrade considerably. The user must remove the unit from the high ambient temperature at this time; failure to comply may result in permanent damage to the unit. Failure to act upon this level of warning may result in serious damage to the system and may invalidate the warranty.

- **General System Failure Warning**

  As part of the operation of the system, the microprocessor monitors certain functions and displays an internationally recognised warning symbol if it detects a fault. The warning, which takes the form of an exclamation mark within a triangle, will appear to the left of the battery status indicator.

  If the warning appears and if appropriate, turn the camera off and leave for five minutes. Turn the camera on and check if the warning symbol has disappeared. If the warning symbol is still present, or the symptoms return, contact e2v technologies.

  Failure to act upon this level of warning may result in serious damage to the system and may invalidate the warranty.

1.5 Operating Notes

The following information relates to a "white-hot" image.

- **Interpreting The Image – Relative Temperatures**
  The image displayed is simply a black and white picture of the infrared energy entering the lens. The camera displays relative temperature differences between individual objects and their surroundings irrespective of overall ambient temperature.
  The camera is set up to display objects at various shades between black for cooler items and white for hotter bodies, e.g. in a room at 20 °C a cold drink would appear black whilst a hot radiator would appear white. However, in a room at 250 °C, it is possible that the same hot radiator may appear darker than, for example, burning materials.

- **Identification of Fire and Hotspots**
  The camera will represent zones of very high temperature as white zones within the picture. When sufficient heat has been detected, e.g. a large area of fire, the camera will automatically enter low sensitivity mode. This will extend the dynamic range of the camera and allow the image of surrounding objects to remain clearly visible.

- **Hidden Fires**
  It is possible that fires may be burning or smouldering behind doors, in ducting or in wall or floor cavities. In such circumstances, the operator should look for areas that appear whiter when compared with the surroundings.
  For example, a fire behind a door will cause the door to appear whiter against the background. Similarly, a white area on an otherwise dark wall could indicate an area of fire behind the masonry.

- **Search for Persons and Objects**
  The camera is not restricted to locating fires. In many cases, the fire-fighter will be using the camera to search for casualties, to seek out dangerous items such as fuel tanks or gas cylinders and also as an aid to navigation through unknown premises.

- **Image Clarity**
  The sharpness and clarity of the image provided is related to the temperature of the scene and objects in view. A cold room provides little infrared energy and less detail is detected than in a warm environment where objects give off significant energy. In general, the warmer the scene, the more thermal contrast and hence the greater detail in the picture.

- **Heat Layers in Closed Spaces**
  In a major fire, a layer of hot gases may build up in the upper region of the closed space. Attempting to use the camera in this hot layer will cause the image to become featureless. By bringing the camera down beneath this layer, the unit is able to provide the fire-fighter with a clearer picture of the scene ahead.

- **Windows and Polished Surfaces**
  Glass is not transparent to long wavelength infrared energy and it is not possible for the operator to use the camera to look through a window. A white window would indicate that the window itself is relatively warm and may be being heated by a fire behind it. Just as we see reflections in glass under normal circumstances, it is possible that the camera can detect infrared reflections in glass, mirrors and polished or painted surfaces. Care must be taken to ensure that the image seen is not simply a reflection. Experience will give the operator added confidence.

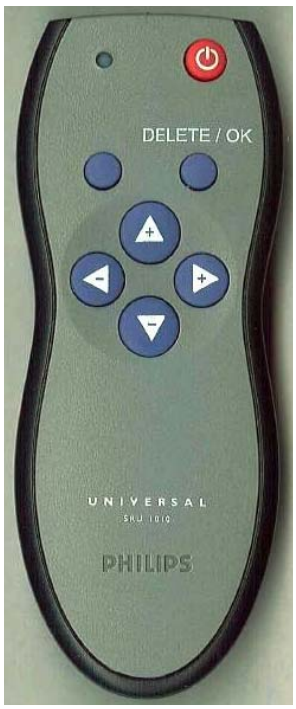
- **Control of Water Streams/Jets**
  When viewed through the camera, water streams from hose reels will appear black against the background scene. The control and direction of a water flow can be monitored by viewing its flow and effect on the fire through the camera. It may be necessary, if employing a water wall, to drop the wall momentarily to view the effects of the extinguishing stream.

- **Smoke Types**
  The camera will provide vision through all types of smoke and steam.

- **Lens Cleaning During Operation**
  The camera lens, like the BA visor, may become obscured during use. The lens may be cleaned with a glove or cloth if necessary.

2. REMOTE CONTROL FUNCTIONS

Some of the Argus^{TM}4 features can be adjusted and set up via the remote control without the need to connect the camera to a laptop/PC. To access the remote control functions, press the RED button on the remote. The screen will show the first option in a list of six. These are:



Time and Date Setting
Dynamic Scene Colourisation Selection
Text Colour
Stored Image: Review and Deletion
LCD Brightness Adjustment
Temperature Units
Language (Argus^{TM}4 HR320)

To access any of these functions, press the **menu ▲** or **menu ▼** buttons until the desired option is displayed. Once the desired option has been selected, each option has further actions (see below). Pressing the **RED** button again will set any changes required and exit the option list or pressing the **menu ▲** or **menu ▼** buttons another option can be selected. The menu will disappear from the image after 8 seconds.

- **Time and Date Setting**
  Press the OK button to enter the time and date settings. Using the **menu ▲** or **menu ▼** buttons, scroll through the hours, minutes, days, months and years. Adjust each setting as required by using the + or - buttons. Once the desired setting has been achieved, scroll to “save time and date” and press OK.

- **Dynamic Scene Colourisation Selection**
  By pressing the + or - buttons, the colour options can be scrolled through. These are:

  Grey Scale (White Hot)
  Grey Scale (Black Hot)
  Heat-Finder Red (White Hot)
  Heat-Finder Red (Black Hot)
  Heat-Finder Soft Red (White Hot)
  Heat-Finder Soft Red (Black Hot)
  Heat-Marker Red
  Heat-Marker Soft Red
  Half Colour
  Full Colour 1
  Full Colour 2
  Full Colour 3
  Green Scale

- **Text Colour**
  By pressing the + or - buttons, the colour of the text, black or white, can be selected.

- **Stored Image: Review and Deletion**
  Review By pressing the + or - buttons, the stored images can be scrolled through.
  Deletion By pressing the + or – buttons, the stored images can be scrolled through until the image required to be deleted is selected. Press the **delete** button twice to delete image.

- **LCD Brightness Adjustment**
  By pressing the + or - buttons, the LCD brightness is increased or reduced.

- **Temperature Units**
  By pressing the + or - buttons, the temperature units, Celsius or Fahrenheit, can be selected.

- **Language (Argus^{TM}4 HR320)**
  By pressing the + or – buttons, the on-screen language can be set to English, French or German.

3. RECHARGEABLE BATTERY PACK AND BATTERY CHARGER

The rechargeable battery system supplied with the Argus™4 camera has been specifically designed to fast-charge the Argus™4 Ni-MH rechargeable batteries (P7030R). The charger is to be used with the Argus™4 Charging Shoe (P7030CS) and is mains powered. The charger is a fully automatic “smart charger”, monitoring voltage, time and temperature and ensures optimum charge for the battery.

Additionally:

- The charger has a built-in start timer that eliminates early termination of charging when a battery is first connected to it. This prevents batteries that have not been used for some time, or are completely discharged, from showing a fully charged status incorrectly.
- If the battery temperature is too low, the charger will start with a trickle charge until the correct operating temperature has been reached.
- If the battery temperature is too high, the charger will reduce the charge rate until the normal operating temperature has been reached.

3.1 Rechargeable Battery Pack

The Argus™4 camera is supplied with two rechargeable battery packs. The rechargeable packs are designed to power an Argus™4 for 4 hours from a full charge and use Nickel Metal Hydride (Ni-MH) cells. The battery pack contains circuitry that monitors the cell’s temperature to ensure that maximum performance is provided and that correct charging is performed. The pack also has a recoverable short-circuit protection.

The battery pack provides an output to the ‘battery status bar’ on the camera display. This battery status bar provides a continuous colour indication of the remaining charge, allowing the fire-fighter to avoid unpredicted power loss.

With a fully charged battery, the battery bar will show full and be coloured green. Depending on the condition of the rechargeable pack, it may remain at this point for some minutes. As the pack ages it may no longer reach its full state.

The battery bar will then progressively decrease as the battery capacity is consumed. When the battery status bar has reached a quarter full, the battery bar will turn orange and there is approximately one (1) hour of battery life remaining.

As the battery capacity is consumed further, the battery bar will turn red and there is approximately 30 minutes of battery life remaining.

When the battery is low, the battery status bar border will turn red and flash to alert the operator. The time remaining will typically be 10 minutes.

Note: It is recommended that before each BA team enters the fire, the camera should be used with a fully charged rechargeable battery.
Disposal of batteries should be in line with local procedures and they should be segregated from domestic waste. Alternatively, the batteries may be returned to e2v technologies for safe disposal.
The battery pack will self-discharge at approximately 2% per day. Battery packs that have been stored off-charge for two weeks will run a camera for at least two hours. It is recommended that the rechargeable batteries are placed into storage fully charged and are routinely recharged so as to be ready for use and to maintain performance. Shelf life is maximised by storage between 10 °C and 25 °C (50 °F and 77 °F).
To maintain the accuracy of the battery charge indicator, e2v recommends that batteries be occasionally fully discharged in a camera before charging.

3.2 Battery Charger

Warnings

- The charger has been designed for indoor use only and should not be exposed to water or dust. Do not cover the charger while in use.
- The charger is turned on once connected to the mains. Disconnecting it from the mains will turn it off. The mains socket should be accessible to allow disconnection if a fault should occur.
- The charger is supplied with several mains cables for worldwide use; ensure that the correct mains lead is used. Check the condition of the mains lead before use.

Hazards

- The charger contains dangerous voltages and the cover should not be removed. There are no user-serviceable parts inside the charger or charging shoe.

Cautions

- Do not charge batteries with too high or low battery temperatures.
- Only use the Argus™4 Rechargeable Battery (P7030R) and Charging Shoe (P7030CS) with this charger.
- Ensure that the battery charger output lead has been correctly fitted to the charging shoe before connection to the mains.

Connect the charging shoe to the charger, plug into the mains and turn the power on. The LED on the charger will be orange for 5 – 7 seconds and then turn yellow. Insert the battery pack into the charging shoe. The LED will remain yellow while the charger is in start up trickle mode. Once the fast charge mode starts, the LED will turn orange.

Note: If the battery temperature is too low (<0 °C, 32 °F) or too high (>40 °C, 104 °F) for charging, the LED will show green while flashing yellow. This will continue until the correct operating temperature has been reached.

If the battery temperature exceeds 60 °C (140 °F), the LED will flash between orange and green. The charger will stop charging and the battery will have to be removed from the charging shoe and the charger will have to be reset by disconnection from the mains.

Once the battery has reached full charge, the charger will go into top-up charge mode and the LED will turn green and flash intermittently yellow. Once the top-up has been completed, the charger will go into maintenance mode and the LED will show green.

It is recommended that the battery be removed from the charging shoe once charged. Before fitting another battery into the charger, allow at least 30 seconds so the battery charger can reset; the LED turning to yellow indicates that the charger has reset.

LED COLOURS DURING NORMAL OPERATION	
LED	**MODE**
Orange	No battery fitted, initial power applied
Yellow	No battery fitted, charger ready for use
Yellow	Battery fitted, start-up trickle charging
Orange	Battery fitted, fast charging
Green with intermittent yellow flash	Top-up charge
Green	Charge complete, maintenance mode
LED COLOURS DURING FAULT CONDITIONS	
LED	**MODE**
Green while flashing yellow	Battery or charger out of operating range.
Flashing between orange and green	Battery or charger has a fault. Remove battery and disconnect the power.

Note: On some models the “orange” LED may appear to have a red tint. This is normal.

4. CLEANING, MAINTENANCE AND REPLACEABLE PARTS

- **Cleaning**
  After use and prior to stowing, the camera should be cleaned. This is best carried out using a cloth soaked with warm soapy water. **Solvents should not be used. If in doubt, contact your supplier.**

- **Maintenance**
  No routine maintenance is required for the camera. If it is not in regular use, it should be switched on for a period of ten minutes every month to check correct operation.

- **Replaceable Parts**
  Due to the environment in which the camera is used, the user can replace certain parts. If any damage beyond these parts occurs, return the camera to e2v technologies or an authorised repair centre.

  Any attempt at repair by unauthorised personnel may cause serious damage and will invalidate the warranty. **THERE ARE NO OTHER USER SERVICEABLE PARTS.**

  Handle (P7030HA)
  To remove the handle, spin the large thumbwheel anti-clockwise until the handle detaches from the camera body. Refitting is the reverse of the above, making sure that the locating pip is positioned correctly.

  Side Straps (P7030SS)
  To replace the side straps, remove the front and rear bumpers. Unbuckle the straps and pull through the retaining pins. Replacement is the reverse of removal.

  Front Bumper (P7030FB), Rear Bumper (P7030RB)
  To replace the front and rear bumpers, unclip the bumper from the groove in the case body and peel off. Replacement is the reverse of removal, making sure that the bumper fits into the groove.

  Other Spares and Accessories

Accessory	Part Number
Neck Strap	P7030NS
Rechargeable Battery Pack	P7030R
Battery Charger Unit	P7030BC
Battery Charging Shoe	P7030CS
Remote Control	P7030RC
USB Computer Lead	P7030PC
Bung	P7030BU
User Manual	P7030UM
CD-ROM	P7030CD
Camera Carry Case	P7030SC
Hard Carry Case	P7030HC

5. SPECIFICATIONS

5.1 Camera Specification

- **Compliance Data**

RFI/EMC	Conducted Emissions -	BS EN 61000-6-3:2001 Class B FCC CFR-47 Part 15
	Radiated Emissions -	BS EN 61000-6-3:2001 Class B FCC CFR-47 Part 15
	Electrostatic Discharge -	BS EN 61000-6-1:2001 Class B
Safety		IEC 60950-1 and related national standards
Vibration/Shock		BS EN 60721-3-2 Class 2M3.
Restriction of the use of Hazardous Substances in electrical and electronic equipment (RoHS)		All parts of the system are compliant with EU directive 2002/95/EC

- **Environmental Data**

Thermal conditions - The camera has been designed to operate for:

- 45 minutes at 80 °C (176 °F)
- 15 minutes at 150 °C (302 °F)
- 7 minutes at 260 °C (500 °F)
- 5 minutes at 260 °C (500 °F) (Argus™4 HR320)

- Minimum operating temperature is –10 °C (14 °F)

Sealing - The camera is sealed to allow short-term immersion in water (IP67)

Impact - The camera has been designed to withstand a drop from a height of 2 metres (78 inches)

Vibration - The camera has been design to withstand transportation vibration defined by BS EN 60721-3-2 Class 2M3

Storage - The camera can be stored for extended periods. It is recommended that for maximum effective operational life, the storage temperature is kept between –10 °C and +40 °C (14 °F and 104 °F) and the camera is retained in its carry case when not in use.

- **Optical Data**

Detector	Sensor type -	Uncooled Microbolometer
	Sensor material -	Amorphous Silicon (ASi)
	Resolution -	160 x 120
	Spectral response -	8 – 14 μm
	MDTD (Minimum Discernible Temperature Difference) -	< 0.1 °C
	Dynamic range -	P7130: -40 °C to 1000 °C (-40 °F to 1832 °F) P7030: -40 °C to 800 °C (-40 °F to 1472 °F) using 3 ranges with auto-switching between ranges.
	Refresh rate -	60 Hz (P7130); 30 Hz (P7030); 9 Hz (P7009)
	Spot temperature range -	-40 °C to 800 °C (-40 °F to 1472 °F)
	Ambient temperature range -	-15 °C to 150 °C (5 °F to 302 °F)
Lens	Lens material -	Germanium
	Focal length -	6 mm; 8.6 mm (P7130)
	Focal distance -	1 m to infinity, optimised at 4 m (3 feet to infinity, optimised at 13 feet)
	Horizontal aperture -	f/1.0
	Field of view -	50° horizontal
Viewing	Display type -	Transflective, active matrix colour TFT
	Display size -	90 mm (3.5 inches)
	Backlight -	White LED

- **Mechanical Data**

	Overall dimensions (H x W x D) -	130 mm x 185 mm x 185 mm (5.1 x 7.2 x 7.2 inch) (nominal)
	including handle (H x W x D) -	295 mm x 185 mm x 185 mm (11.5 x 7.2 x 7.2 inch) (nominal)
Weight	without battery -	< 1.2 kg (2.6 pounds)
	with battery -	< 1.5 kg (3.3 pounds)
	with battery and handle -	< 1.7 kg (3.7 pounds)
Materials	Outer camera case -	Radel®R-5100
	Rear bumper -	Multiflex®
	Front bumper -	Multiflex®
	Neck strap -	Nomex®
	Side straps -	Nomex®
	Handle -	Radel®R-5100 overmoulded in Santoprene®

- **Electrical Data**

Power Supply	Power consumption -	3 W typical
	Start-up time -	5 seconds typical

5.2 Rechargeable Battery and Charger Specification

- **Battery**

Type -	Ni-MH Rechargeable Battery
Capacity -	2300 mAH
Battery life -	4 hours @ ambient temperature (22 °C, 72 °F)
Charge time -	2 hours nominal
Recharge cycles -	500 @ 80% capacity
Length -	125 mm (4.8 inches) nominal
Width -	55 mm (2.2 inches) nominal
Height -	50 mm (2 inches) nominal
Net weight -	220 g (0.1 pounds) nominal
Charging temperature -	0 °C – 40 °C (32 °F – 104 °F) 65 °C (149 °F) can be tolerated
Sealing -	IP56

- **Charger**

Power requirements -	100 – 240 VAC, 50/60 Hz, 1 A max
Length -	105 mm (4 inches) nominal
Width -	65 mm (2.5 inches) nominal
Height -	35 mm (1.4 inches) nominal
Net weight -	220 g (0.1 pounds) nominal
Operating temperature -	0 °C – 40 °C (32 °F – 104 °F)
Protection -	Over-voltage and over-temperature protection built into the charger and battery.
Compliance -	EMC Directive 89/336/EEC Low Voltage Directive 73/23/EEC BS EN60335 Part 1 and Part 2-29
RoHS -	All parts of the system are compliant with EU directive 2002/95/EC
Sealing -	IP20

- **Charging Shoe**

Length -	150 mm (5.8 inches) nominal
Width -	70 mm (2.75 inches) nominal
Height -	50 mm (2 inches) nominal
Net weight -	200 g (0.1 pounds)
Operating temperature -	0 °C – 40 °C (32 °F – 104 °F)
Sealing -	IP20

6. WARRANTY TERMS

6.1 Express Warranty

e2v technologies ("e2v") warrants that this product is free from mechanical defects or faulty workmanship for two (2) years from the date of shipment, with the exception that the warranty period for the battery charger is one (1) year and for the rechargeable battery pack is six (6) months from that date, provided it is maintained and used in accordance with e2v's instructions and/or recommendations.

This warranty does not apply to expendable or consumable parts whose normal life expectancy is less than one (1) year. Replacement parts and repairs are warranted for ninety (90) days from the date of shipment.

e2v shall be released from all obligations under this warranty in the event that persons other than its own or authorised service personnel make repairs or modifications, or if the warranty claim results from misuse of the product. No agent, employee or representative of e2v may bind e2v to any affirmation, representation or modification of this warranty concerning the goods sold under this contract.

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6.2 Exclusive Remedy

It is expressly agreed that the Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of e2v, or for any other cause of action, shall be the repair and/or replacement, at e2v's option, of any equipment or parts thereof, that after examination by e2v are proven to be defective. Replacement equipment and/or parts will be provided at no cost to the purchaser, F.O.B. e2v's plant. Failure of e2v to successfully repair any non-conforming product shall not cause the remedy established hereby to fail of its essential purpose.

6.3 Exclusion of Consequential Damages

PURCHASER SPECIFICALLY UNDERSTANDS AND AGREES THAT UNDER NO CIRCUMSTANCES WILL e2v BE LIABLE TO PURCHASER FOR ECONOMIC, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES OF ANY KIND WHATSOEVER INCLUDING, BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS AND ANY OTHER LOSS CAUSED BY REASON OF THE NON-OPERATION OF THE GOODS. THIS EXCLUSION IS APPLICABLE TO CLAIMS FOR BREACH OF WARRANTY, TORTUOUS CONDUCT OR ANY OTHER CAUSE OF ACTION AGAINST e2v.

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This product is licensed under the MPEG-4 visual patent portfolio license for the personal and non-commercial use of a customer for:

- Encoding video in compliance with the MPEG-4 visual standard ("MPEG-4 video");

  and/or

- Decoding MPEG-4 video that was encoded by a customer engaged in a personal and non-commercial activity and/or was obtained from a video provider licensed by MPEG LA to provide MPEG-4 video. No license is granted or shall be implied for any other use.

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